

MARITIME HERITAGE MINNESOTA



MHM IS A 501.(c).3 NON-PROFIT CORPORATION
DEDICATED TO THE DOCUMENTATION,
CONSERVATION, AND PRESERVATION OF
MINNESOTA'S FINITE MARITIME CULTURAL
RESOURCES

Ann Merriman
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Minnesota Archaeology License
21-191

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Lake Minnetonka Nautical Archaeology Project Series 10

Phase II Excavation of the Dakota Unfinished Dugout Canoe Wreck 21-HE-557



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Acknowledgments

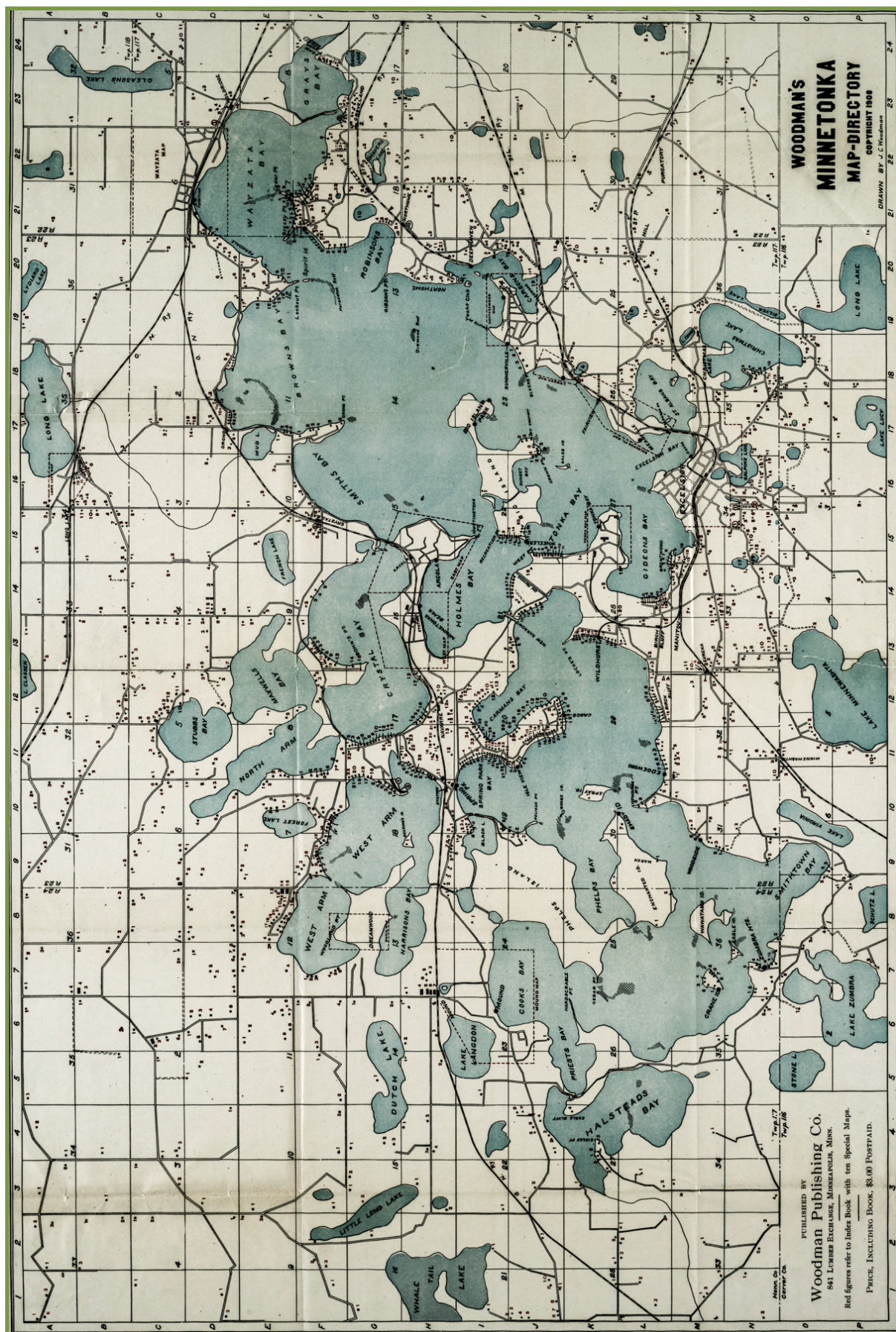
Maritime Heritage Minnesota (MHM) thanks great group of people who donated funds that allowed the 2020 and some of the 2021 fieldwork in Lake Minnetonka to take place: Cheryl Ahlcrona, Ardy and Jack Becklin, Brad Buxton, Martha and Mickey Elmore, James Gray, Mary Northway Kosfeld, Mike and Karen Kramer, Billie Lennon, Dr Jeremy Nienow of Nienow Cultural Consultants LLC, Drs Don and Jo Ann Parkerson, Pat Rud, Todd Warner, and Maury and Dru York. Dedicated donations from Pat Montgomery and Tom Trow allowed the C14 analysis of a wood sample from Anomaly 1000, conducted by Beta Analytic. Most of the 2021 fieldwork was funded by a Minnesota Historical and Cultural Heritage Grant, part of the Arts and Cultural Heritage Fund of the Clean Water, Land and Legacy Amendment. MHM thanks the People of Minnesota for their support of this grant program. We thank Amanda Gronhovd, Bruce Koenen, and Jennifer Tworzyanski of the Office of the State Archaeologist for their efforts. Many thanks to MHM friend Dr Ron Schirmers for his wood typing expertise. MHM could not have completed this project without the in-kind support of volunteer divers Josh Knutson, Kelly Nehowig, and Greg Flanagan. MHM thanks these talented and ethical men for their time and skill. We also thank our volunteers Betty Lloyd and Ann Nehowig for their constant support. This project could not have been completed in a timely fashion without the consideration of Michael and Karen Kramer; the use of their Lake Minnetonka boathouse for research boat *Anomaly 51* is greatly appreciated. Lastly, MHM thanks our Board of Trustees Michael F Kramer, Deb Handschin, and Steve Hack for their continued support.

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All fieldwork images recorded by MHM, Josh Knutson, and Kelly Nehowig.



Map of Lake Minnetonka 1908

“ACHF grants have allowed a small St. Paul-based nonprofit, Maritime Heritage Minnesota (MHM), to re-establish the discipline of underwater archaeology in Minnesota. Without this support, MHM could not have conducted its groundbreaking nautical archeological and maritime historical research.”

~Steve Elliott, Former Minnesota Historical Society CEO and Director, January 2015

Introduction

Wrecks and the artifacts associated with them tell a story. Removing or otherwise disturbing artifacts, treating them as commodities that can be sold, obliterates that story. Nautical archaeological and maritime sites are finite, and are significant submerged cultural resources. Nautical, maritime, underwater, maritime terrestrial – Maritime Heritage Minnesota's (MHM) deals with all of these types of sites throughout the State of Minnesota. MHM's Mission is to document, conserve, preserve, and when necessary, excavate these finite cultural resources where the welfare of the artifact is paramount. MHM is concerned with protecting our underwater and maritime sites – our shared Maritime History – for their own benefit in order for all Minnesotans to gain the knowledge that can be obtained through their study. MHM's study of wrecks does not include the removal of artifacts or damaging the sites in any way. MHM does not raise wrecks or 'hunt' for 'treasure'. Submerged archaeological sites in Minnesota are subject to the same State statutes as terrestrial sites: the Minnesota Field Archaeology Act (1963), Minnesota Historic Sites Act (1965), the Minnesota Historic District Act (1971), and the Minnesota Private Cemeteries Act (1976) if human remains are associated with a submerged site. Further, the case of *State v. Bollenbach* (1954) and the Federal Abandoned Shipwrecks Act of 1987 provide additional jurisdictional considerations when determining State oversight and "ownership" of resources defined by law as archaeological sites (Marken, Ollendorf, Nunnally, and Anfinson 1997, 3-4). Therefore, just like terrestrial archaeologists working for the State or with contract firms, underwater archaeologists are required to have the necessary education, appropriate credentials, and hold valid licenses from the Office of the State Archaeologist (OSA).

Preface

During the LMNA-10 Project, that encompassed the field seasons of 2020 and 2021, MHM investigated 3 known wrecks and 37 unknown anomalies. Anomaly 1000 was 1 of the 37 unknown anomalies. Technically, however, MHM had already determined the probability of Anomaly 1000 being a dugout canoe - prior to the beginning of the 2021 fieldwork season - was high. MHM volunteer Kelly Nehowig, during late-season dives in 2020, came upon Anomaly 1000 and recorded images of the site.



Dugout Canoe Phase II Project Objectives

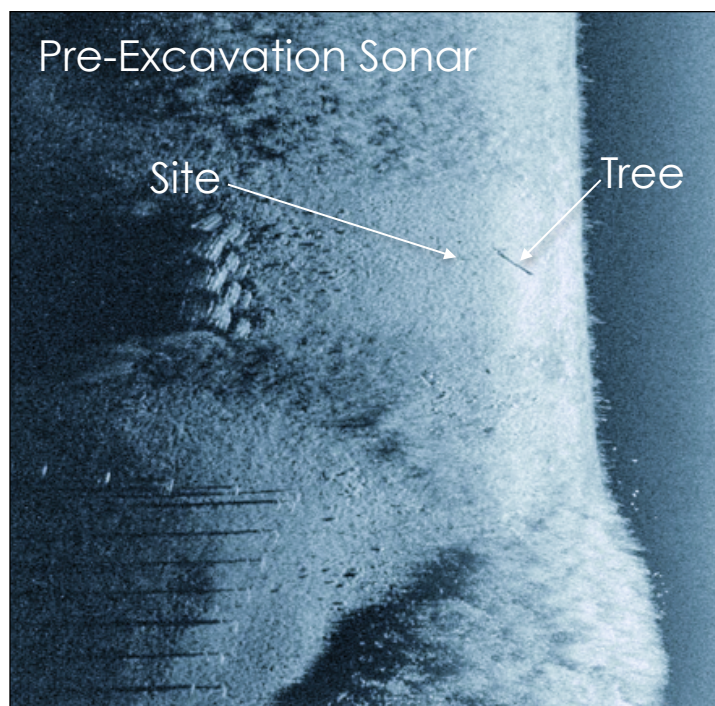
Research problems associated with Anomaly 1000 stem primarily from its uniqueness; no other dugout canoe has been recorded *in situ* by underwater archaeologists in Minnesota. Therefore, there are no direct comparisons to be made for site characteristics, but the nature of the site's location (shallow), and the partially exposed end of the canoe assists MHM in formulating questions that need to be answered during a Phase II investigation. In relation to the site's boundaries, the possibility exists that additional dugouts may be in the area, and one objective of this excavation is this determination. The reasoning behind this supposition is evidenced by sites in North Carolina and Florida, where dozens of dugout canoes that have been dated to span thousands of years, have been found in 'caches'. In North Carolina's Lake Phelps, a shallow 16,600 acre body of water in Pettigrew State Park, 30 dugout canoes were found during low water conditions in 1986. All of the vessels were removed by North Carolina underwater archaeologists and documented; the longest watercraft in the group of 30 artifacts was 37.00 feet long. Twenty-six of them were returned to the water and reburied for their safety. Four canoes were conserved and wood samples taken for C14 testing; they dated from 900 BCE to 1,400 AD (Schudel 1986; Smith 2020). Florida has the largest known number of dugout canoes discovered in archaeological contexts in the world. To date, there are 423 known dugout canoes that are part of 314 sites in the state. For example, the Pithlachocco Canoe Site in Newnan's Lake had 101 dugouts, the Stricklin's Peat Bog Site had 19 canoes, the Lake Hollingsworth Site had 14 canoes, and the Lake Trefford Site had 10 dugouts (Duggins 2017). These large caches of watercraft in North Carolina and Florida exhibit the Native American habit of purposefully sinking dugout canoes for their preservation with the intention of future re-use.

The known Minnesota dugout canoes that have been discovered by non-archaeologists - 13 in number - have been documented and C14 dated by MHM¹. Of these watercraft, only one of them can be characterized as being encased in matrix (like Anomaly 1000) in relatively shallow water in a lake - the Lake Minnetonka North Arm Dugout Canoe (21-HE-438). It is unknown if the matrix included stones since they were not mentioned in the description of the matrix, but the canoe was "imbedded in earth" (Gunnarson and Gunnarson 1966). Because of these facts, the *in situ* Anomaly 1000 provides a never-before available opportunity to determine - to answer the question - if stones on top of the watercraft were deliberately placed for submerged preservation. This project objective is significant since there is a possibility that the stones and gravel covering the canoe were dumped on top of the watercraft after they were cleared from the shoreline to create beachfronts. The dumping of collected shoreline detritus into Lake Minnetonka was a common occurrence in the 19th and 20th Centuries, but the dumps would more often occur in deeper water. MHM contends that intentional disposition of stones on the dugout canoe would appear more uniform in their placement without gravel or sand matrix mixed within the pile.

The exposed nature of one end of the dugout canoe - that allowed for the watercraft's discovery - raises questions as to the site's more recent history. A project objective is the determination of the process or mechanism that led to the partial exposure of

¹See MHM's Minnesota Dugout Canoe Project Reports (Merriman and Olson 2016a-b, 2015, 2014).

Anomaly 1000. MHM contends the exposure of the canoe occurred relatively recently; volunteer Kelly Nehowig has dove this area repeatedly every year for the last decade and did not notice the dugout until November 2020. The identification of the site in MHM's sonar footage prior to 2021 is problematic due to the gravel matrix and vegetation on and around the canoe; the sonar data more readily shows the hard pebbles in the gravel as a stronger return than wood, masking its signature. However, MHM has located the dugout canoe in sonar footage with the assistance of the GPS coordinates collected by Nehowig; note that the signature would never have been identified as a dugout canoe or any type of vessel just from sonar footage. As for 'how' one end of the canoe became uncovered - relatively recently - MHM suggests that repeated exposures to propellor wash from outboard and inboard/outboard boats and wave runners, blew the matrix off of the vessel. Additionally, MHM has witnessed flat work barges in the area as recently as 2019; these boats carry high horsepower single or double outboards that depend on strong prop wash to keep them in place when spuds are not practical or to pivot them in confined spaces. MHM has recorded hundreds of prop wash signatures from passing boats during sonar surveys over the years; some of the wash extends downward into the water column 30-40 feet or more in some cases. Even small vessels can push prop wash down 11 feet into the water column and hit the lake bottom - and disturb the matrix covering the dugout canoe². Weeds in the vicinity of Anomaly 1000 keep the matrix in place somewhat, but powerful props can blow big divots into the lake bottom. Post-excavation, sandbags will be placed onto the dugout for its protection - a project objective.



The last 2 objectives of this dugout canoe excavation are to acquire core samples for C14 dating and wood species typing. The date range that will be produced from the testing will assist MHM in determining probable cultural affiliations for the artifact, based on the presence of Native American groups around Lake Minnetonka during different time periods. Radiocarbon results might indicate not only a historical context for the dugout, but a European cultural affiliation; a dugout canoe 'removed' from nearby Lake Auburn in Carver County was determined by MHM - through two C14 tests - that the tree used to shape the watercraft was felled in the early 1930s. Additionally, Anomaly 1000's wood type determination can be an indicator of probable geographic locations

²Archaeological site 21-HE-562 - the Homebuilt Wood and Steel Composite Wreck - identified and documented by MHM in 2021 - is a site that clearly shows the effects of prop wash on a submerged archaeological site within the same field season (Merriman and Olson 2022, 14-18).

where the tree grew; the weight of dugouts suggests they were not good candidates for long-distance traveling overland and portaging. Because of this fact, and the outlet of Lake Minnetonka in Gray's Bay - Minnehaha Creek - was not conducive to upstream travel - it is probable the tree used to create the dugout canoe was local to Lake Minnetonka. Additionally, wood type can back-up or support C14 dating results given that the deforestation of Lake Minnetonka occurred during the latter half of the 19th Century, leading to tree species changes in the new growth of the area.

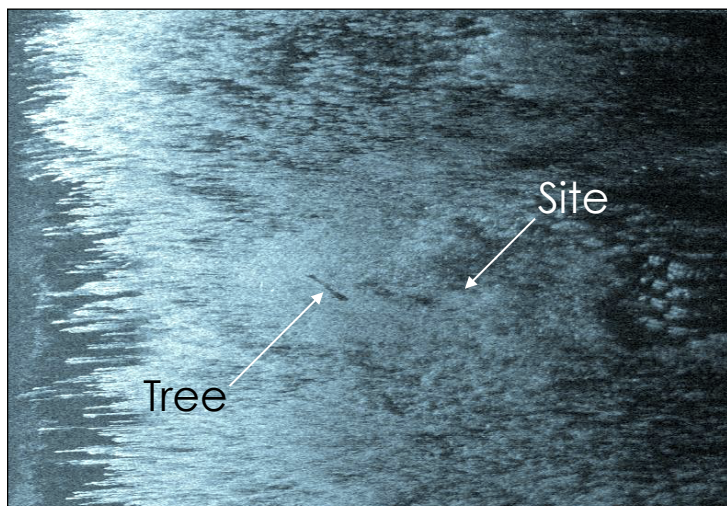


Pre-Excavation



Results: Phase II Excavation
Dakota Unfinished Dugout Canoe Site, 21-HE-557 (Anomaly 1000)
Minnesota Archaeology License 21-191

In August and September 2021, MHM conducted 6 days of fieldwork that exposed Anomaly 1000 with the assistance of volunteers Kelly Nehowig and Josh Knutson. For purposes of this investigation, the exposed portion of Anomaly 1000 was considered the 'bow'. Prior to the Phase II excavation of Anomaly 1000, MHM recorded the area using sonar several times in order to obtain an over-all pre-disturbance/pre-excavation site image; underwater photography cannot always serve this purpose due to visibility. Traditional underwater archaeological excavation techniques using an airlift or water dredge were not appropriate for this site; an airlift requires deeper water to function properly and a water dredge may tear the artifact apart. Therefore, to achieve project objectives, MHM conducted simple manual removal of gravel, sand, and rocks - those not associated with the dugout that were used to weigh it down - from the top and sides of the dugout canoe. Then, simple hand-fanning cleaned residual particles off the watercraft, repeatedly during the documentation of the site. The stone field surrounding Anomaly 1000 is uneven and haphazard, comprised of stones of various sizes. With the exception of the stone sitting on the end of the canoe, MHM contends the large jumble of stone, silt, and sand matrix on top of Anomaly 1000 is 'fill' that was dumped on the site or that migrated over the hull over time.



During Excavation





During Excavation



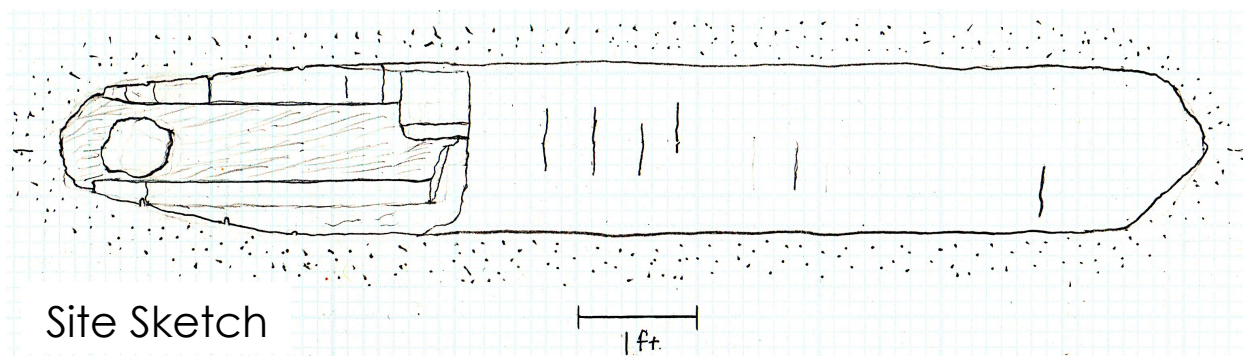
Score Lines



Nearly
Detached
Chunk

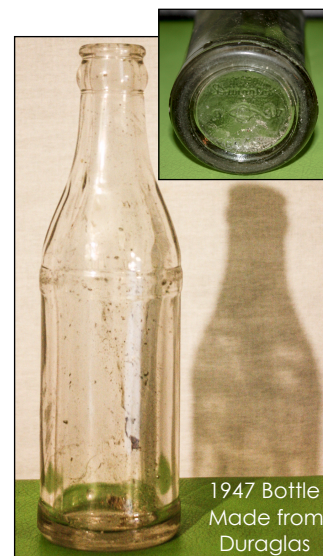


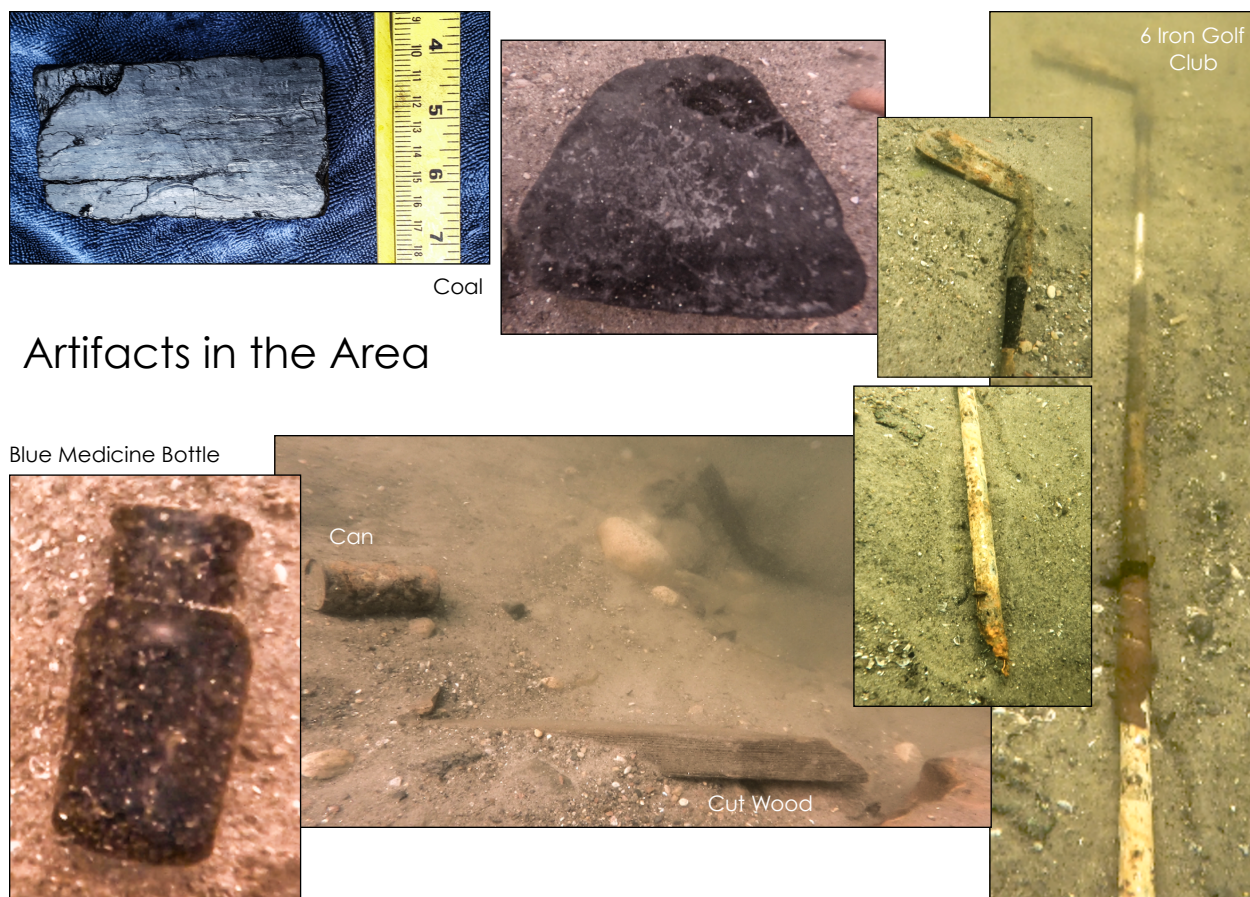
'Stern'



The dugout canoe is 9.40 feet long and 1.30 feet in diameter - and the artifact is unfinished. Prior to excavation, the exposed portion of the hull measured 3.00 feet and there is evidence of burning inside the canoe. Often, controlled fire was utilized to gut the center of logs for dugout production, and to round the ends by suspending the log over flames. At the bow, a large fishing lure is hanging from the dugout; MHM left the lure in place so as to not damage the artifact. Grooves in the hull mark areas where unneeded wood was removed from the log by a crosscut saw - either a 2-person type or bowed type - to create the hull. One chunk of wood has been cut on 4 sides but it is still attached to the log on its underside. This portion of the artifact provides a significant amount of information in relation to the vessel's construction. Beyond that point, the 'hull' no longer existed and the 'log' is intact. The log section is marked with at least 6 score lines that would guide the canoe builder where to cut the wood to fashion the last 2/3 of the hull. All over the log section of Anomaly 1000, small irregular slashes are the tool marks created by the maker during the bark removal process. The log end retains evidence of the tree's felling; there are no saw marks but MHM contends an axe was used to cut a wedge on the 'port quarter' of the dugout to the point that it toppled under its own weight. Irregular marks 'along the centerline' and on the 'starboard quarter' of the unfinished end of the dugout suggests it snapped free from the tree stump and hit the ground. MHM inserted a rebar probe into the trunk part of the artifact and determined at least 3.00 feet of it was hollowed-out beyond the already-formed part of the canoe. The underside - 'hull bottom' - of the Dakota Unfinished Dugout Canoe Wreck is encased in clayish silt that is the lake bottom.

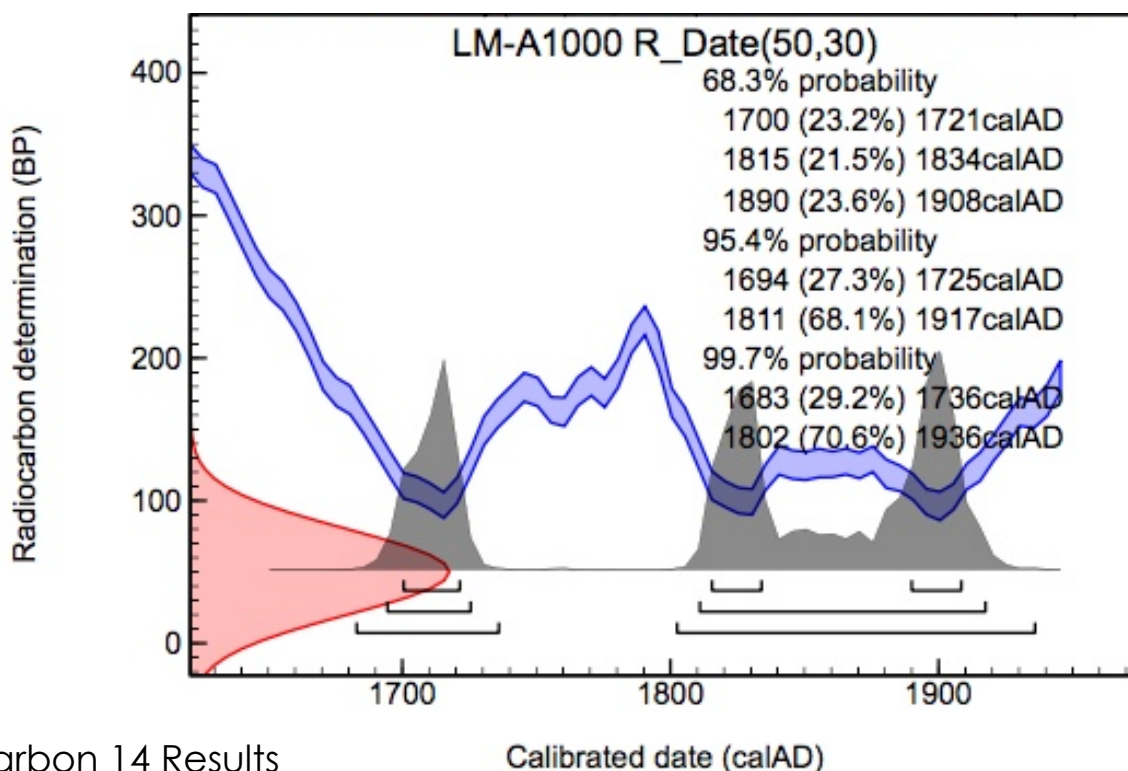
The unfinished 'stern'/log end of Anomaly 1000 had 4.00 feet of matrix above it, primarily comprised of silt, sand, gravel, and field-type stones. Throughout the excavation, many feet of nylon fishing line were encountered in the matrix and on both sides of the canoe. Also within the matrix, 2.00-4.00 feet above the dugout canoe, three short 2 by 4s with nails in them and a clear bottle from 1947 were encountered. Between 2.00-3.00 feet above the artifact, pieces of cut coal were found. A small 3.00-inch long medicine-type bottle, shards of broken glass, and partial fishing lures were strewn within the matrix and nearby on the bottom of the lake, along with rusted cans. A rusted 3-iron golf club was found on top of the gravel to the northwest of the canoe.





Artifacts in the Area

MHM contends the relative dating of the historic items in the matrix above the dugout canoe - while still is a probable jumble - can provide a baseline for the movement of the gravel and field-type stones over the site. Further, the lack of artifacts in the 2.00 feet of matrix directly above Anomaly 1000 suggests this section of gravel and stones moved onto the site through natural forces; the shallow nature of the wreck makes it vulnerable to heavy wave action at times. Also, MHM contends the 'bow' was uncovered by strong propellor washes that shifted the silt, sand, gravel, and stones during the last 2 or 3 decades. MHM took wood samples using a core borer for C14 analysis. The results indicate that a construction (tree felling) date range of 1683-1908, with a more narrow possible date range of 1802-1908. However, using additional relative dating, MHM contends this range can be further refined based on the construction date of near-by historic buildings that were located directly to the east of the site and the presence of coal in the matrix above the canoe. Beginning in 1880 with the construction of large buildings in the area, steamers regularly docked literally over the location of Anomaly 1000 and probably took on coal there, too - and possibly off-loaded coal for building boilers. Therefore, the date range can be further refined to 1802-1880. Additionally, the fact that the canoe is embedded in lake bottom clay suggests an earlier construction date than 1880, possibly prior to 1850 before the occupation of Lake Minnetonka by Europeans and their habit of dredging the lake bottom and the movement of spoil to different areas. Therefore, while it is possible the Dakota Unfinished Dugout Canoe Wreck was constructed as early as 1683, the C14 data and relative dating of the site more strongly supports a date range of 1802-1850. Wood typing of the dugout indicates it was fashioned out of a basswood tree, *Tilia americana* (Dr Ron Schirmers, personal communication, November 2021).



Carbon 14 Results

MHM placed the small medicine bottle, glass shards, and the golf club under a nearby tree on the lake bottom for their safety. The complete clear bottle and a coal sample, along with a statement from MHM on the dates this work was conducted, were placed in a waterproof bag and placed within the hull of the canoe. A barrier to prevent gravel migration onto the wreck was placed around the hull and log sections of Anomaly 1000 during the excavation, and left in place. Filled sandbags were molded around delicate areas of the dugout and other filled sandbags were placed on top of the hull and the log section, covering it entirely. If fishing lures, fishing line, propellor wash, or other objects come near the dugout canoe, the sandbags will prevent any further damage to the site. Additionally, if further archaeological work is required at the site, the artifact can be easily uncovered for study and re-covered for its protection.



The Coal
and 1947
Duraglas
Bottle in the
Hull Prior to
Re-Burial

Stored in a Plastic Bag

Post-Excavation

Site Covered With
Sand Bags and
Rocks



Post-Excavation Sonar

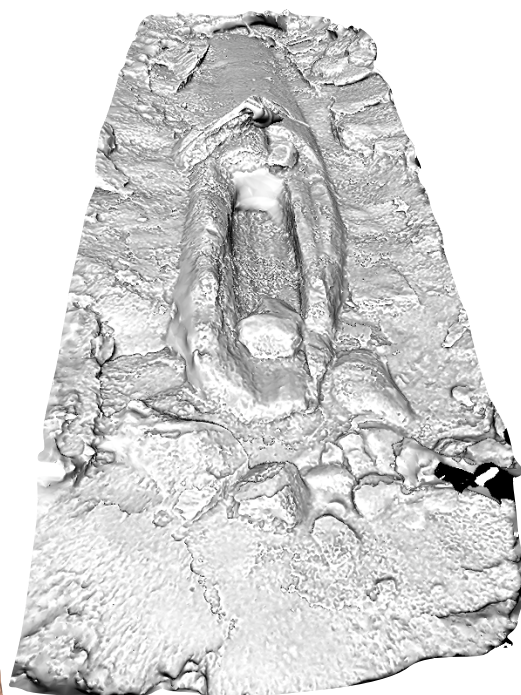


MHM's ability to create 3D models of underwater sites has been made possible by a generous monetary donation from MHM friend Dr Natalie Rosen. The donation paid for Agisoft Metashape software and a high capability graphics computer.

Sand Bag and
Rock in Place
to Support the
Nearly Loose
Chunk



Photogrammetric
Model of the Dakota
Unfinished Dugout
Canoe Wreck
21-HE-557

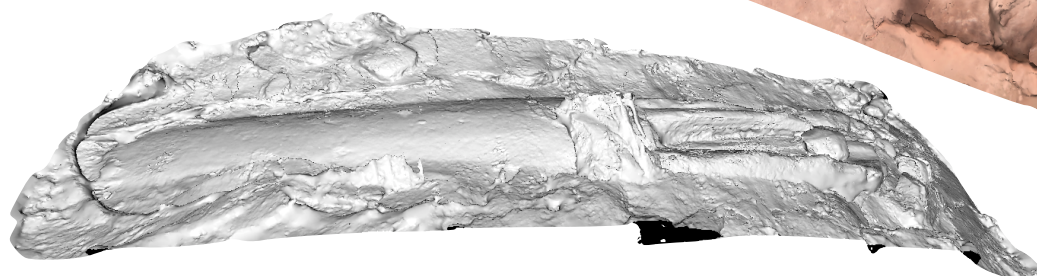
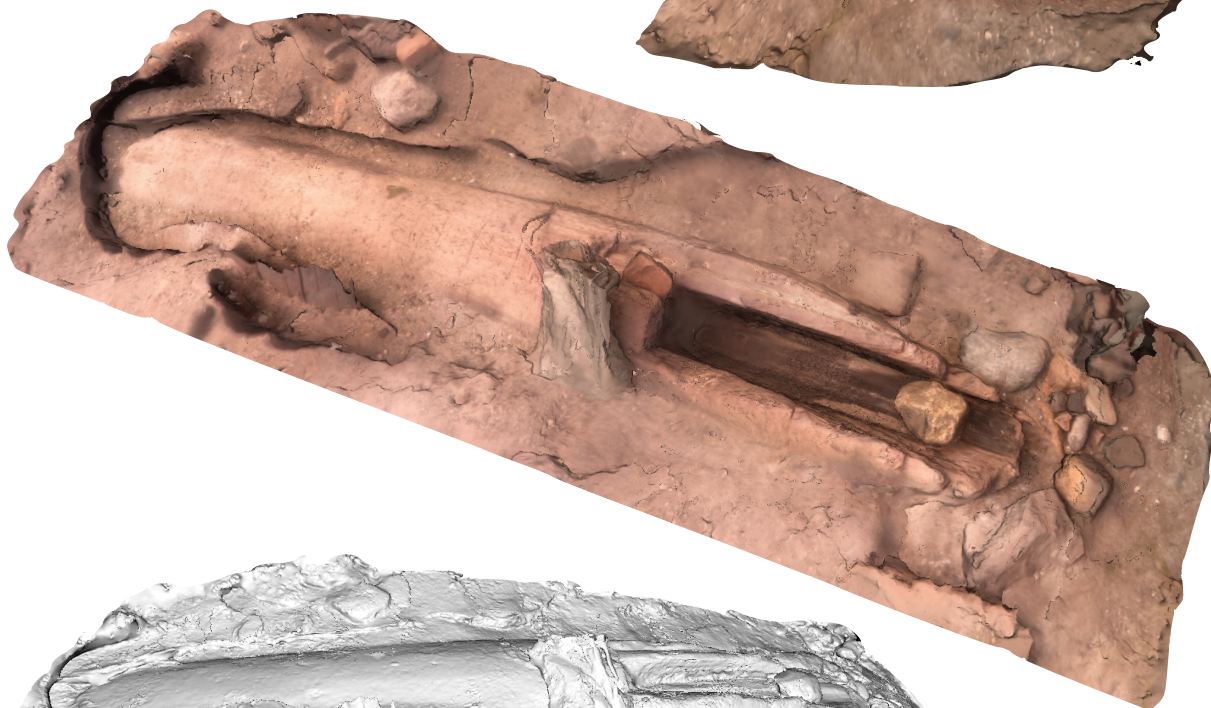
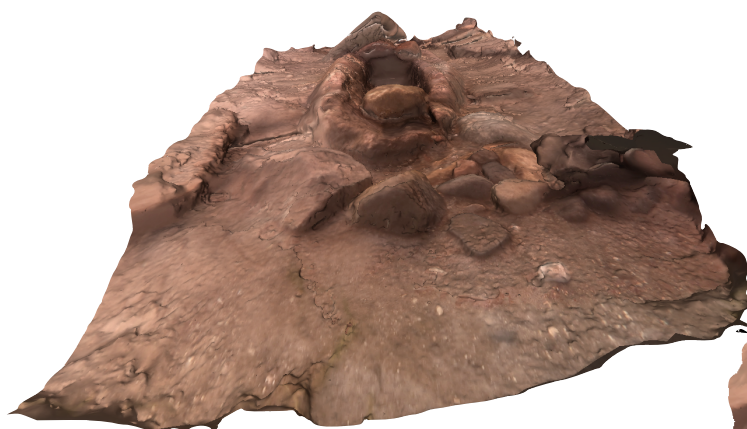
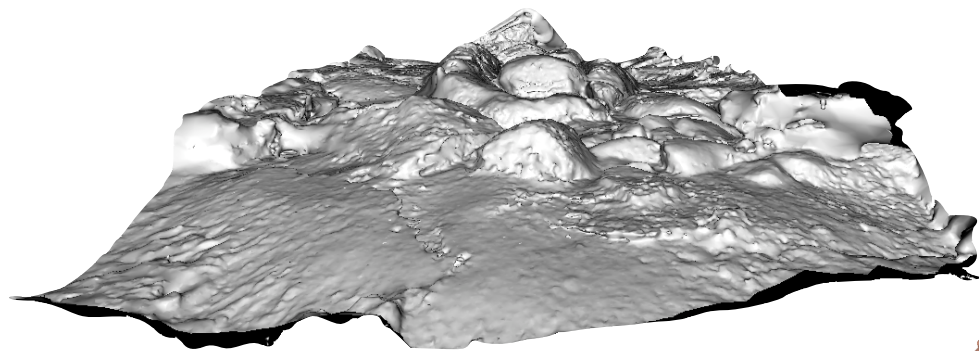


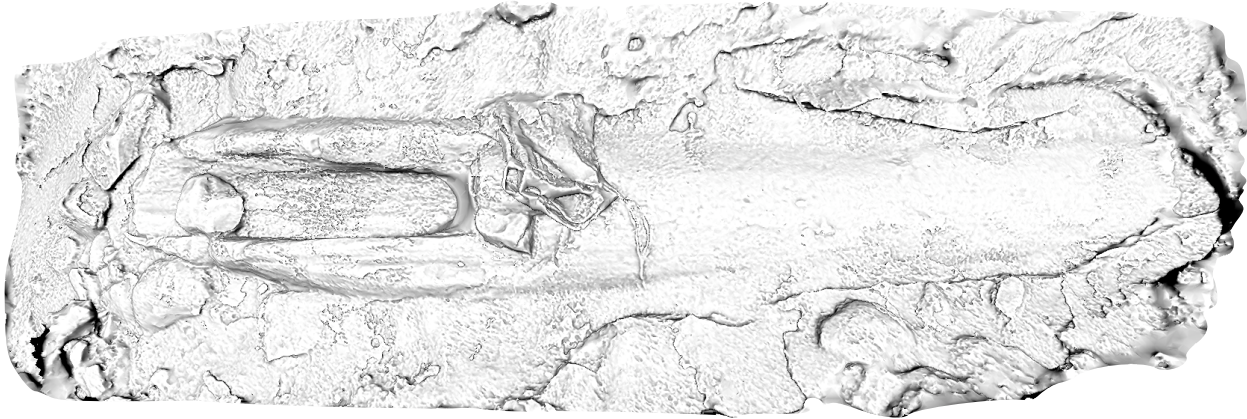
Photogrammetric
Model of the Dakota
Unfinished Dugout
Canoe Wreck
21-HE-557

Color renditions and
greyscale

Different Angles







Conclusion

The Dakota Unfinished Dugout Canoe Wreck (21-HE-557) is the only known Native American dugout canoe *in situ* in Minnesota; and one of only 2 known unfinished dugouts found in archaeological contexts in the US³. The incomplete nature of the dugout is archaeologically significant because of the amount of useful information that has been accumulated pertaining the construction process: score lines, cuts, axe cuts, and de-barking marks. It is possible the Dakota Unfinished Dugout Canoe Wreck was constructed as early as 1683, but using the the C14 data and relative dating of the site in combination more strongly supports a date range of 1802-1850; it is the oldest wreck on the lake bottom. It is a member of a group of personal watercraft on the bottom of the lake that represents 220 years - and possibly as much as 339 years - of Minnesota waterborne transportation. However, the Lake Minnetonka North Arm Dugout Canoe was constructed around 1,000 years ago, but it is no longer on the lake bottom; it is housed at the West Hennepin History Center in Long Lake.

³The Wakulla Unfinished Canoe discovered in Wakulla County, FL, is the other known example (Duggins 2017). It is unknown if this artifact was excavated; 21-HE-557 may be the only unfinished dugout canoe known that is still *in situ*.

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